CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. ____
FOR
HOWARD ESTATE AND UNIMIN CORPORATION
UNIMIN CORPORATION, IONE PLANT
TAILINGS IMPOUNDMENTS
AMADOR COUNTY

Compliance with this Monitoring and Reporting Program, and with the companion Standard Provisions and Reporting Requirements, is ordered by Waste Discharge Requirements Order No. ____. Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements for Discharges of Mining Wastes dated February 2009, constitutes noncompliance with the WDRs and with the Water Code, which can result in the imposition of civil monetary liability.

A. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Reports which do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the WDRs. In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Historical and current monitoring data shall be graphed at least once annually. Graphs for the same constituent shall be plotted at the same scale to facilitate visual comparison of monitoring data. A short discussion of the monitoring results, including notations of any water quality violations shall precede the tabular summaries. Data shall also be submitted in a digital format acceptable to the Executive Officer.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those which cannot be quantified and/or specifically identified. Field and laboratory tests shall be reported in the quarterly monitoring reports. The results of any monitoring done more frequently than required at the locations specified herein shall be reported to the Board.

B. REQUIRED MONITORING REPORTS AND SUBMITTAL DATES

1. Semiannual Groundwater and Surface Water Monitoring Reports

All Semiannual-monitoring reports shall include all water quality data and observations collected during the reporting period and submitted per the **Reporting Due Dates** in Section B.5. of this Monitoring and Reporting Program. At a minimum the sampling and data collection in Tables 1, 2 and 3 of this Monitoring and Reporting Program, Standard Provisions and Reporting Requirements for Discharges of Mining Wastes (2009), and Waste Discharge Requirements shall be reported.

2. Annual Monitoring Summary Report

The Discharger shall submit an Annual Monitoring Summary Report to the Board covering the previous monitoring year. The annual report shall contain the information specified in Standard Provisions and Reporting Requirements for Discharges of Mining Wastes (2009), Section VIII.B. of the "*Reports to be Filed with the Board*."

3. Facility Monitoring Report

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control system, groundwater-monitoring equipment (including wells, etc.), and shall include the Standard Observations contained in Section XII.S. of Standard Provisions and Reporting Requirements for Discharges of Mining Wastes (2009).

4. Water Quality Protection Standard Report

Any proposed changes in a statistical method or concentration limits for a constituent of concern or monitoring parameter a Water Quality Protection Standard Report shall be submitted and include the information required in Section C.1. of this Monitoring Reporting Program. Any changes to Water Quality Protection Standards shall be approved by the Executive Officer in a Revised Monitoring and Reporting Program.

5. Submittal Dates

Semiannual Groundwater and Leachate Monitoring Reports

Reporting Type	Sampling Frequency and Data Reported	Reporting Period	Report Date Due
Semiannual Monitoring Report	Monthly, Quarterly and Semiannually	1January – 30 June 1 July – 31 December	**31 July** **31 January**

Annual Monitoring Summary Report	**31 January**
Facility Monitoring Report	**15 November**
Response to a Release	**as necessary**
Water Quality Protection Standard Report	**as necessary**

6. Response to a Release

If the Discharger determines that there is significant statistical evidence of a new release (i.e. the initial statistical comparison or non-statistical comparison indicates, for any Constituent of Concern or Monitoring Parameter, that a new release is tentatively identified), the Discharger shall immediately notify the Board verbally as to the Monitoring Point(s) and constituent(s) or parameter(s) involved, shall provide written notification by certified mail within seven days of such determination and implement Response to Release section of the Standard Provisions and Reporting Requirements for Discharges of Mining Wastes (2009).

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

For each waste management unit (Unit), the Water Quality Protection Standard shall consist of all constituents of concern, the concentration limit for each constituent of concern, the point of compliance, and all water quality-monitoring points. The Discharger proposes to establish intra-well Water Quality Protection Standards. For each water quality monitoring point concentration limits will be established for each constituent of concern.

The Water Quality Protection Standard for naturally occurring waste constituents consists of the constituents of concern, the concentration limits, and the point of compliance and all monitoring points. The Executive Officer shall review and approve the Water Quality Protection Standard, or any modification thereto, for each monitored medium.

The report shall:

a. Identify **all distinct bodies of surface and groundwater** that could be affected in the event of a release from a Unit or portion of a Unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.

b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the point of compliance in accordance with §20405 of Title 27.

c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

   If subsequent sampling of the background monitoring point(s) indicates

significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the Water Quality Protection Standard.

2. Constituents of Concern

The constituents of concern include all the waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit. The constituents of concern for all Units at the facility are those listed in Tables 1 through 4 for the specified monitored medium.

Monitoring Parameters

Monitoring parameters are constituents of concern that are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a Unit. The monitoring parameters for all Units are those listed in Tables 1 through 3 for the specified monitored medium.

3. Concentration Limits

For a naturally occurring constituent of concern, the concentration limit for each constituent of concern shall be determined as follows:

a. By calculation in accordance with a statistical method pursuant to §20415 of Title 27; or

b. by an alternate statistical method acceptable to the Executive Officer in accordance with §20415 of Title 27.

Concentration limits previously established for some constituents at some monitoring locations are shown in Table 1.

4. Point of Compliance

The point of compliance for the water standard at each Unit is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the Unit.

Table 1 – Intra-Well Concentration Limits*

Monitoring Point	**Sodium** (mg/L)	**TDS** (mg /L)
MW-A	136	733
MW-B	95	785
MW-K	191	825
MW-E	124	1361
MW-I	135	1098

* Concentration Limits calculated for constituents with at least 10 measurements using the Tolerance Limit statistic for 95% confidence and 95% coverage (*Gibbons Robert D., 1991, Statistical Tolerance Limits for Groundwater, Ground Water. v29, no.4*).

D. MONITORING

The Discharger shall comply with the monitoring program provisions of Title 27 for groundwater and surface water in accordance with Monitoring Specifications in Standard Provisions and Reporting Requirements (2003). All monitoring shall be conducted in accordance with a Sample Collection and Analysis Plan, which includes quality assurance/quality control standards, that is acceptable to the Executive Officer.

All point of compliance monitoring wells established for the detection-monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All detection monitoring program groundwater monitoring wells and surface water monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern as indicated and listed in Tables 3 through 4.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those which cannot be quantified and/or specifically identified.

At a minimum, postclosure monitoring shall be required until water quality conditions have been demonstrated to be stable or improving for at least two years.

1. Waste Discharge Monitoring

The Discharger shall monitor all wastes discharged to the Tailings Impoundment or process water pond on a weekly, monthly and quarterly basis and report the results in the semi-annual Detection Monitoring Reports:

Table 2 - Waste Discharge Monitoring

Parameters	Units	Frequency
Percent Moisture	%	Weekly
Dry Density	Lbs/ft.^{3}	Monthly
Quantity Discharged	Cubic yards	Quarterly
Remaining Capacity	Cubic yards	Quarterly
Minimum Freeboard	Ft. & Tenths	Quarterly

Percent moisture and dry density will be measured on in place tailings as part of a field density test collected after the tailings have consolidated approximately two weeks.

2. Impoundments

Tailings and process water impoundment water samples shall be collected in a convenient location at least 50 feet from the influent structure. A sample of free liquids in the tailings impoundments shall be tested for the following:

Table 3 - Impoundment Monitoring

Parameters	Units	Frequency
Field Parameter		
Freeboard	Feet & Tenths	Monthly
Temperature	^{o}C	Semi-Annually
Specific Conductance	µmhos/cm	Semi-Annually
pH	pH number	Semi-Annually
Monitoring Parameters		
Total Dissolved Solids	mg/L	Semi-Annually
Sodium	mg/L	Semi-Annually
Chloride	mg/L	Semi-Annually
Sulfate	mg/L	Semi-Annually
Dissolved iron	µg/L	Semi-Annually
Dissolved lead	µg/L	Semi-Annually
Dissolved nickel	µg/L	Semi-Annually
Dissolved aluminum	µg/L	Semi-Annually
Dissolved arsenic	µg/L	Semi-Annually

3. Groundwater

The Discharger shall operate and maintain a groundwater detection monitoring system that complies with the applicable provisions of §20415 of Title 27 in accordance with a Monitoring Program approved by the Executive Officer. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan. The background monitoring system consists of two up-gradient wells (MW-J and –N). The detection monitoring system consists of seven wells (MW-A, -B, -K, -E, -I, -L and –M). Any new monitoring wells will be added to the monitoring system upon their completion.

The Discharger shall determine the groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional zone of saturation monitored pursuant to this Monitoring and Reporting Program, and report the results semiannually.

Groundwater samples shall be collected from the point-of-compliance wells, background wells, and any additional wells added as part of the approved groundwater monitoring system. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and frequency specified in Table 3.

The monitoring parameters shall also be evaluated each reporting period with regards to the cation/anion balance, and the results shall be graphically presented using a Stiff diagram, a Piper graph, or a Schueller plot.

Table 4 - Groundwater Monitoring

Parameters	Units	Frequency
Field Parameter		
Groundwater Elevation	Ft., & hundredths, MSL	Semi-Annually
Temperature	^{o}C	Semi-Annually
Specific Conductance	µmhos/cm	Semi-Annually
pH	pH number	Semi-Annually
Monitoring Parameters		
Total Dissolved Solids	mg/L	Semi-Annually
Sodium	mg/L	Semi-Annually
Chloride	mg/L	Semi-Annually
Sulfate	mg/L	Semi-Annually
Dissolved iron	µg/L	Semi-Annually
Dissolved lead	µg/L	Semi-Annually
Dissolved nickel	µg/L	Semi-Annually
Dissolved aluminum	µg/L	Semi-Annually
Dissolved arsenic	µg/L	Semi-Annually

4. Surface Water Monitoring

The surface water detection monitoring system shall consist of any pond that routinely contains mine process water. The Discharger shall collect and analyze surface water samples for the monitoring parameters in accordance with the methods and frequency specified in Table 3. All monitoring parameters shall be graphed so as to show historical trends at each sample location.

5. Facility Monitoring

a. Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control system, groundwater-monitoring equipment (including wells, etc.), and shall include the Standard Observations contained in section F.4.f. of Standard Provisions and Reporting Requirements. Any necessary construction, maintenance, or repairs shall be completed by **31 October**. By **15 November** of each year, the Discharger shall submit an annual report describing the results of the inspection and the repair measures implemented, including photographs of the problem and the repairs.

b. Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage **within 7 days** following **major storm events**. Necessary repairs shall be completed **within 30 days** of the inspection. The Discharger shall report any damage and subsequent repairs within 45 days of completion of the repairs, including photographs of the problem and the repairs.

The Discharger shall implement the above monitoring program on the effective date of this Order.

Ordered by: _____
Pamela Creedon, Executive Officer

_____
Date